Radioisotope Brief: Strontium-90 (Sr-90)

Half-life: 29.1 years

Mode of decay: Beta radiation

Chemical properties: Chemically reactive; can create halide, oxide, and sulfide compounds

Beta particles are subatomic particles that are ejected from the nucleus of unstable atoms. Beta particles can travel through several layers of human skin, and exposure to large sources of beta radiation can cause burns or skin reddening. Beta particles that enter the body can damage cells, which may lead to cell death or, later in life, to cancer.

Gamma radiation is a packet of energy, called a photon that is emitted from the nucleus of an unstable atom. Gamma radiation is high-energy electromagnetic radiation that can penetrate most substances (lead is the best barrier against gamma radiation). Because of its high energy, gamma radiation can penetrate the human body from outside and damage cells, which could lead to cancer later in life.

What is it used for?

Because Sr-90 generates heat as it decays, it is used as a power source for space vehicles and for remote weather stations and navigational beacons. It also is used in industrial gauges and medically, in a controlled manner, to treat bone tumors.

Where does it come from?

Sr-90 is produced commercially through nuclear fission for use in medicine and industry. It also is found in the environment from nuclear testing that occurred in the 1950s and 1960s and in nuclear reactor waste and can contaminate reactor parts and fluids.

What form is it in?

Sr-90 is a soft metal. It can be present in dust from nuclear fission after detonation of nuclear weapons or a nuclear power plant accident.

What does it look like?

In its pure form, Sr-90 is a soft, shiny silver metal, but it quickly changes to yellow when exposed to air.

How can it hurt me?

Sr-90 can be inhaled, but ingestion in food and water is the greatest health concern. Once in the body, Sr-90 acts like calcium and it is readily incorporated into bones and teeth, where it can cause cancers of the bone, bone marrow, and soft tissues around the bone.

Sr-90 decays to yttrium 90 (Y-90), which in turn decays by gamma radiation so that wherever Sr-90 is present Y-90 is also present. Because of the gamma radiation, Y-90 poses a risk of burns to the eyes and on the skin from external exposure.

For more information on Sr-90, see the Public Health Statement by the Agency for Toxic Substances and Disease Registry at http://www.atsdr.cdc.gov/toxprofiles/phs149.html, *or visit the Environmental Protection Agency at* http://www.epa.gov/radiation/radionuclides/strontium.htm

For more information about health effects related to uranium exposure, see CDC's fact sheet on "Radiation and Health Effects," at www.bt.cdc.gov/radiation/healthfacts.asp.

For more information on protecting yourself before or during a radiologic emergency, see CDC's fact sheet titled "Frequently Asked Questions (FAQs) About a Radiation Emergency" at

www.bt.cdc.gov/radiation/emergencyfaq.asp, *and "Sheltering in Place During a Radiation Emergency," at* www.bt.cdc.gov/radiation/shelter.asp.

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